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Gordon [GB/GB]; 115 Machan Road, Larkhall ML9 1HU (GB).

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(74) Agents: MACDOUGALL, Donald, Carmichael et al.; Marks & Clerk, 19 Royal Exchange Square, Glasgow G1 3AE (GB).

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(71) Applicant (for all designated States except US): UNIVERSITY COURT OF GLASGOW CALEDONIAN UNIVERSITY [GB/GB]; Cowcaddens Road, Glasgow G4 0BA (GB).

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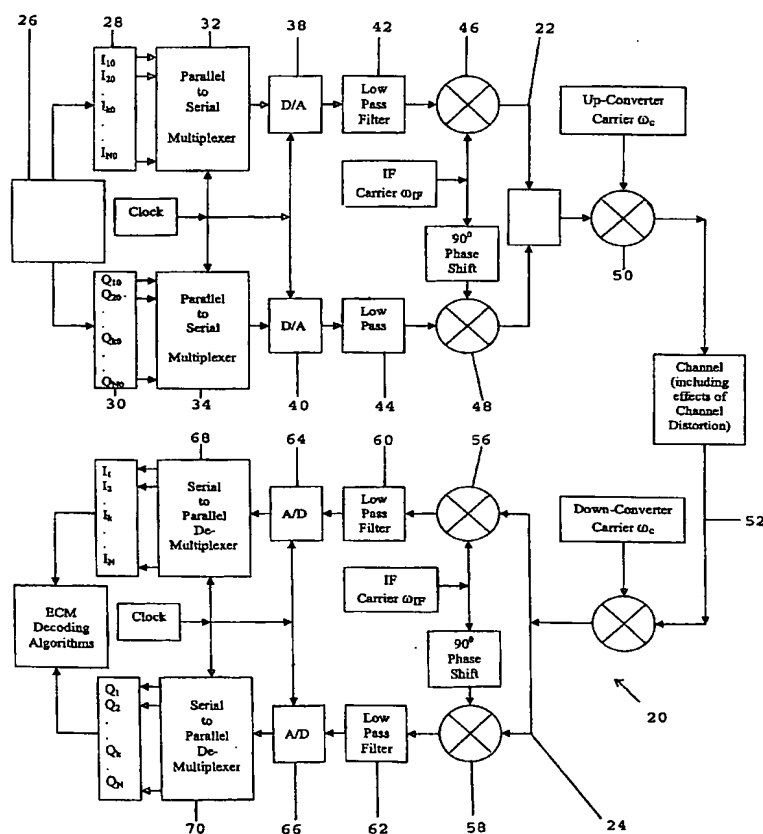
(72) Inventor; and

(75) Inventor/Applicant (for US only): STEWART, Brian,

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(54) Title: MULTICARRIER SYSTEM WHEREIN CONTROL DATA IS SUMMED TO INFORMATION DATA



(57) Abstract: A system and method for encoding data for transmission over a telecommunications network. The system and method involve embedding a control data block (I_{k0}) within a plurality of real data blocks (I_{N0}). Preferably, real data in the real data blocks (I_{N0}) is convoluted with at least some of the control data in the control data block (I_{k0}). For example, each entry in each real data block (I_{N0}) may be phase convoluted with phase angle of the corresponding entry in the control block using an encoding module (26). Once this is done, the real data in the real data blocks and additionally the control data block in the control block is modulated with every sub carrier.

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A. CLASSIFICATION OF SUBJECT MATTER
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According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

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Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the International search (name of data base and, where practical, search terms used)

EPO-Internal, WPI Data, PAJ, INSPEC, COMPENDEX

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

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Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2
NL - 2280 HV Rijswijk
Tel: (+31-70) 340-2040, Tx. 31 651 epo nl,
Fax: (+31-70) 340-3016

Authorized officer

Marse111, M

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C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 93/09622 A (MOTOROLA INC) 13 May 1993 (1993-05-13)	1,2,7, 13-18, 20-22, 27, 32-36, 39-41, 45, 51-55, 58-60, 62-67
Y A	page 6, line 29 - page 9, line 3 page 13, line 5.- page 14, line 3 figures 1,4a,6a,6b	37,56 3-6, 8-12,19, 23-26, 28-31, 38, 42-44, 46-50, 57,61
X	EP 0 752 779 A (NOKIA MOBILE PHONES LTD ; NOKIA TELECOMMUNICATIONS OY (FI)) 8 January 1997 (1997-01-08)	1-5,7, 13-16, 21-25, 27, 32-34, 40-43, 45, 51-53, 59-67
Y A	column 2, line 45 - column 3, line 37 figure 2a	37,56 6,8-12, 17-20, 26, 28-31, 35,36, 38,39, 44, 46-50, 54,55, 57,58

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

/GB2004/001129

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
WO 9309622	A	13-05-1993	US 5519730 A	21-05-1996
			AU 663109 B2	28-09-1995
			AU 2467792 A	07-06-1993
			BR 9205509 A	05-04-1994
			CA 2098011 A1	29-04-1993
			CN 1072048 A ,B	12-05-1993
			GB 2266645 A ,B	03-11-1993
			HK 1000870 A1	01-05-1998
			JP 6504176 T	12-05-1994
			JP 3455537 B2	14-10-2003
			KR 9612169 B1	16-09-1996
			MX 9206164 A1	01-04-1993
			WO 9309622 A1	13-05-1993
EP 0752779	A	08-01-1997	FI 953283 A	04-01-1997
			EP 0752779 A2	08-01-1997
			US 5828650 A	27-10-1998